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Stress and Risky Decision Making: Cognitive Reflection, Emotional Learning or Both.

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RUNNING HEAD: Stress and reflection effects on the IGT

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Abstract

Stressful situations hinder judgment. Effects of stress induced by anticipated public speaking on the Iowa Gambling Task (IGT) were examined. The Cognitive Reflection Task (CRT) was used to examine the relationship between reflective thinking and IGT performance. The stress manipulation increased blood pressure and was associated with poorer IGT and CRT performance. Stressed participants were slower to avoid the disadvantageous decks. Moreover, CRT scores correlated with optimal deck selections indicating the importance of reflective thinking for good performance on the IGT. These correlations were observed in relatively early trials, which challenges the view that analytic thinking is not important when card contingencies are being learned. Data revealed that IGT performance in healthy individuals is not always optimal; stress levels impair performance. A mediation analysis was consistent with the proposal that the stress manipulation reduced IGT performance by impeding reflective thinking. Thus reflective processing is an important explanation of IGT performance in healthy populations. It was concluded that more reflective participants appear to learn from the outcomes of their decisions even when stressed.

Key words: Stress, Decision-Making, Iowa Gambling Task, Cognitive Reflection Task, Dual Process Theory.

Introduction

Everyday decision-making often occurs under stressful conditions, whereby affective states that can underpin adaptive decision-making can be interrupted by stress[1] (Preston, Buchanan, Stansfield, & Bechara, 2007; Starcke & Brand, 2012). Traditionally emotion was seen as a disruptive factor; however, since Damasio's (1994) ground breaking Somatic Marker Hypothesis, emotion has increasingly been seen as making an adaptive contribution to cognitive processing. This changing perspective has been particularly prescient in judgment and decision-making research such that interest in emotional and cognitive foundations of decision-making has increased (Bechara, Damasio, Damasio & Anderson, 1994; Cella, Dymond, Cooper, & Turnbull 2007; Cassotti & Moutier, 2010). Emotional factors previously identified as a 'nuisance', interfering with good judgment, increasingly appear to take a pivotal role in complex decision-making (Bechara & Damasio, 2005) and may create a platform for emotion based learning (Damasio, 1996; Turnbull, Evans, Bunce, Carzolio, & O'Connor, 2005).

Stress often accompanies decision making tasks and research suggests that this may alter both the cognitive and emotional processes involved in risky decision-making (Schwabe & Wolf, 2009; Preston et al., 2007; Starcke, Wolf, Markowitsch & Brand, 2008). For example, stress can have a detrimental effect on cognitive processes such as impairing working memory capacity (e.g., Otto, Raio, Chiang, Phelps & Daw, 2013), reducing decision accuracy (e.g., Waldstein & Katzel, 2005) and that incidental anticipatory stress impacts on learning and information processing abilities (Preston et al., 2007). There is, moreover, a long-standing debate in psychology regarding the interplay between cognition and emotion (e.g., Dunn,

[1] We define stress as a mental tension resulting from the presence of a stressor that results in a compensatory psychological and physiological response (Lovallo, 2016).

Dalgleish & Lawrence, 2006); it remains unclear which of these levels of processing is more disrupted under stress conditions (e.g., Turnbull, Bowman, Shanker & Davies, 2014). Accordingly, the present study examines the role of these processes in risky decision-making under incidental anticipatory stress and control conditions.

Gambling tasks, such as the Iowa Gambling Task (IGT, Bechara, et al., 1994), offer a means of testing decision preferences and performance and have become the central experimental paradigm in evaluation of emotion-based learning and decision-making. Participants are required to choose cards from four card decks, all of which differ in frequencies of financial rewards and punishments. Advantageous decks offer moderate rewards and small punishments whereas disadvantageous decks offer larger rewards but substantial punishments, which result in an overall loss. In other words, advantageous decks have greater expected value than disadvantageous decks. Decisions to select advantageous decks were considered to be due primarily to emotional processing of the rewards and punishments from previous trials which result in the development of somatic markers (Damasio, 1996: Bechara, Damasio, Tranel, & Damasio, 2005), whereas the impact of executive function is seen as comparatively limited (Brand, Recknor, Grabenhorst & Bechara, 2007). Thus, it was assumed that IGT participants slowly develop a feeling about the 'goodness' or 'badness' of decks and progressively acquire conceptual knowledge and awareness about the game contingencies. Traditionally, it was assumed that the key feature of the task is that participants need to relinquish short-term for long-term gains in order to make more advantageous decisions (Bechara & Damasio, 2005). Subsequent research, however, challenged the 'myopia for the future' account of IGT performance view, and accounts based on hyper-sensitivity to reward are now more favoured in the literature (e.g., Bauer, Timpe, Edmonds, Bechara, Tranel, & Denburg, 2013).

Moreover, Bechara et al.'s (1994) initial hypothesis that conscious awareness and performance on the IGT are unrelated was challenged, with access to explicit knowledge about decks leading to improved deck selection (Maia, & McClelland, 2004). Bowman, Evans and Turnbull (2005) further argued that an explicit evaluation of affective choices guides future decision-making, and Schiebener, Zamarian, Delazer and Brand (2011) demonstrated that the IGT involved learning the probabilities of gains and losses rather than requiring trade-offs of short-term versus long-term outcomes. The debate is not yet settled however, as Fernie and Tunney (2013), demonstrated that not all participants attain conscious awareness of the properties of the decks, and that conceptual knowledge was not essential for advantageous deck selection. Thus, it appears that complex decision-making may hinge on the emotion –mediated, explicit knowledge and analytic thought, but the precise nature of this process remains an open question.

Dual-process theories of cognitive processing contrast unconscious, emotional, intuitive, and effortless (Type I processing) with conscious, controlled, and effortful characteristics (Type II) (e.g., Kahneman, 2011). Evans (2008) argued that people use both types of processing interchangeably depending on the context of the situation. Hence, in risky decision-making, a Type I intuitive/emotional decision can be adjusted with Type II analytic thinking; however, if the decision needs to be made under uncertain conditions, such as in the IGT, Type I processing may play a more prominent role (Kahneman, 2003). Frederick (2005) developed the Cognitive Reflection Test (CRT) to measure the ability to resist intuitive responses, thus eschewing Type I processing for Type II and while there continues to be a debate about the aspect of Type II thinking that the CRT measures (e.g., Stupple, Gale & Richmond, 2013; Toplak, West, & Stanovich, 2011) it is utilised here as a general measure of analytic thinking.

IGT studies have also shown that stress can interfere with the learning process in healthy controls, increase risk-taking behaviour and lead to disadvantageous card selections (Preston et al., 2007; van den Bos, Harteveld & Stoop, 2009). Preston et al. (2007) induced stress by informing participants that they would deliver a speech while being videotaped and evaluated, and demonstrated that stressed participants showed a slower learning curve on the IGT than the control group. Their results were interpreted as evidence that incidental anticipatory stress interfered with the development of somatic markers and that this may have been due to a disruption of working memory (Hinson, Jameson & Whitney, 2002). Preston et al. argued that their findings should be replicated with a larger sample and that further systematic examination of the effects of emotion on the IGT was required. In accounting for their results, Preston et al. proposed that the stress manipulation shifted cognitive processes away from deliberative processing towards automatic reflexive processes; however, they did not test this conjecture directly. In the present study, we replicate the stress manipulation with a larger sample and include a direct measure of deliberative thinking.

The main aims of the present study were to (1) examine the role of stress in delaying card selection optimisation on the IGT; (2) examine the effect of stress on analytic thinking (as measured by the CRT); (3) examine whether analytic thinking predicts the ability to optimise card selection; and (4) examine whether stress responses or analytic thinking or both predict card selection scores. In order to examine delayed card selection optimization we used two scoring methods: monetary outcomes and advantageous selections minus disadvantageous selections. It was hypothesised that the stress manipulation will inhibit performance on the IGT and delay the elimination of disadvantageous deck selections. It was also predicted that stress would reduce participants' reflective ability as measured by the CRT; this represents the first direct test of stress on CRT scores in the literature. It was further hypothesised that cognitive reflection scores would significantly correlate with scores in the later trials, but not during the earlier trials, consistent with Brand et al.'s (2007) argument that higher-level cognitive processes are only important in the later trials. Finally, we tested the relationship between CRT scores, stress and IGT performance by using mediation analyses.

Method

Participants

Twenty-nine male and 31 female, age range: 19-26 years, healthy students from a UK university were recruited and randomly allocated to stress and control groups. All participants gave informed consent, in accordance with stipulations of the local ethics committee. People under the age of 18 years old and people who reported depression, anxiety, any cardiovascular disease, or high blood pressure were excluded from participation. After providing information about the study, participants were informed that they will receive participation points and that a participant with the highest score on the IGT will receive a £100 reward[2].

Materials

Stress manipulation

This study used a modified version of Preston et al.'s (2007) anticipatory speech task. Preston et al., (2007) used a video camera and a microphone directed toward the participant, a two-way mirror and a timer visible to the participants and placed next to the computer screen. We installed a video camera that simulated recording during the experiment and participants in the experimental group were told that they would be video-recorded during their performance and they would have to summarise their experience at the end of the experiment in front of the

[2] Note that this was included to ensure participants remained motivated, but potentially increases risk taking.

camera. Control participants were not given a description of a speech before the task and the camera was not present in the room.

Physiological measurement

Systolic blood pressure (SBP) responses to stress were measured to check whether the manipulation was effective. An Omron M6 – HCE, blood pressure monitor was used to measure SBP in both groups. Three baseline SBP measurements were taken before the initiation of tasks followed by five SBP measurements taken during the IGT performance after each block of 20 picks. SBP responses were calculated by subtracting the average of the performance SBP measurements from the average of resting SBP measurements.

Stress perception

The impact of stressful events may also be determined by individuals' perception of their stressfulness (Seery, Weisbuch, & Blascovich, 2009). Therefore, participants were asked, 'How stressed were you during the completion of the task?' and 'Were you anxious during the experimental processes?' Responses were on a 5-point Likert scale ranging from 'No not at all', to 'Yes definitely' and were averaged.

Iowa Gambling Task

Bechara et al.'s (1994) non-computerised version of IGT and standard instructions were used; participants were required to choose individual cards from four decks that provide financial rewards and punishments. The gain loss frequencies were as follows: Deck A= 5 gains, 5 losses; Deck B= 9 gains, 1 loss; Deck C= 6.25 gains, 2.5 standoffs, 1.25 losses; Deck D= 9 gains, 1 loss. The overall final outcomes were as follows: A= -1000; B= -1000; C= +1000; D= +1000. Bechara et al.'s IGT instructions for non-computerised version were followed.

Consistent with Bechara et al., four decks of 40 cards were used, but the back of the decks were identical. One hundred trials were completed (five blocks of 20).

Cognitive Reflection Test

The three-item CRT (Frederick, 2005) was used as a measure of reflective or analytic thinking. The CRT consists of problems where an intuitive answer must be resisted in order to reach the correct solution. For example, a typical item is ‘A bat and a ball costs £1.10. The bat costs £1.00 more than the ball. How much does the ball cost?’

Procedure

Following consent, participants sat for a five-minute resting period and then baseline SBP measurements were taken. Next they were randomly allocated to groups, the instructions regarding the presentation to the camera were only given to the experimental group and they were shown the camera which was then switched on. The camera was not present in the room for the participants in the control group. The CRT was administrated followed by the IGT and SBP measurements. After the completion of the IGT task the participants responded to questions regarding their perception of the stressfulness during the task performance. Participants in the experimental group were told that they would not have to give the speech at that point. Finally, participants were debriefed, and post-task SBP measurements were taken.

Analytic strategy and Scoring

Initial analyses focused on checking that the stress manipulation was effective: ANOVA was used to determine if SBP responses and perceived stress (assessed by questionnaire) differed by condition. Next, 2 (condition) x 5 (block) mixed ANOVAs were used to determine the effect of the manipulation on IGT scores across the five blocks utilising two scoring methods: Standard scoring was derived by deducting total disadvantageous card picks (A+B) from total advantageous picks (C + D). A positive score suggests a more advantageous decision-making strategy, whereas a negative score suggests a disadvantageous decision-making strategy. We also computed the total winnings from the task in pounds (£). As parametric assumptions were not met, a Mann-Whitney test was used to examine if there were differences in CRT scores between the two conditions. Correlation coefficients were calculated to determine relationships between SBP responses, perceived stress, CRT scores and IGT performance during each block, for each group separately. Finally, a bootstrapped mediation model tested the conceptual model outlined in Figure 1. All hypotheses were tested simultaneously using the "Process" macro for SPSS (Hayes, 2012), with 10,000 bootstrapping re-samples and bias-corrected 95% confidence intervals (CIs) for each indirect effect. In bootstrapping analyses, bias corrected CIs that do not contain 0 signify a significant mediational effect (Preacher & Hayes, 2004, 2008). Direct effects estimate how much two cases differing on the independent variable (stress manipulation) also differ on the dependent variable (total IGT score: (C+D)-(A+B)), independent of the effect of the mediator variables (SBP responses and CRT scores) on the dependent variable. Total effects are the sum of the indirect and direct effects of the independent variable (stress manipulation) on the dependent variable (IGT scores) (Hayes, 2012). Analysis was conducted using IBM SPSS 22 for Windows with an alpha = .05. No participants were excluded from the analysis.

Results

Manipulation Check

ANOVA revealed a condition (stress vs. control) effect for SBP responses, $F(1,58) = 54.0$, $p < .001$, $\eta_p^2 = .48$; responses were larger in the stress condition than in the control condition (see Table 1). Further, ANOVA determined that participants in the stress condition reported more stress than the control, $F(1,58) = 23.7$, $p < .001$, $\eta_p^2 = .29$, indicating that the stress manipulation was effective (see Table 1).

Table 1 here

IGT Performance

ANOVA was used to determine the effect of the stress condition on the standard IGT score (C+D – A+B) across the five blocks of the IGT task (see Table 2). There was a main effect of the stress condition, $F(1,58) = 18.84$, $p < .001$, $\eta_p^2=.25$, a main effect of block, $F(4,232) = 38.44$, $p < .001$, $\eta_p^2=.40$, and a significant block x stress manipulation interaction, $F(4,232) = 4.72$, $p = .001$, $\eta_p^2=.08$, on standard IGT score. Independent t-tests revealed that participants in the stress condition had lower IGT scores in blocks 3, 4 and 5 compared with participants in the control condition (Bonferroni adjusted threshold $p < .01$).[3]

In contrast, when ANOVA was used to determine the effect of stress condition on monetary outcomes across the five blocks of the IGT task using scoring with monetary values, not all of these effects were apparent (see Table 2). Although there was a main effect of the stress condition, $F(1,58) = 29.56$, $p < .001$, $\eta_p^2=.34$, and a main effect of block, $F(4,232) = 41.96$, $p < .001$, $\eta_p^2=.42$, on IGT scores, there was no significant block x stress condition effect, $F(4,232) = 0.48$, $p > .1$, $\eta_p^2=.01$.

Table 2 here

CRT Performance

A Mann-Whitney test showed differences in CRT scores between the two groups: participants in the stress condition had lower CRT scores (Median=1, IQR=1) than participants in the

[3] When decks were analysed separately there were no differences between deck A versus B, or C versus D

control condition (Median=2, IQR=1), U = 252, p = .002, demonstrating that reflective thinking was inhibited by stress (with a medium effect size, r= -.39).

Correlates of IGT card selections

Bivariate correlations between standard IGT scores per blocks and CRT scores revealed medium to large correlations across both conditions. Further correlations between standard IGT scores for each block and CRT scores were then calculated for stress and control conditions separately. There were correlations between CRT scores and standard IGT scores blocks two, three (marginally) and four in the stress condition, but only in blocks two and three for the control condition. In other words, higher CRT scores were associated with better performance in those blocks. Comparison of correlations using z-score transformations revealed a significant difference between blocks 1 and 2 in the control condition, but there were no other differences.

Table 3 here

Further analyses revealed no reliable correlations of SBP responses or stress perception with card selections or CRT scores in either condition (all r<.2, all p >.50).

Mediation Analyses

Results of the mediation analyses indicated that the direct effect of stress manipulation on IGT was not significant when controlling for the mediators, b = 4.90, t = .69, p = .50. However, there was a significant indirect effect of stress manipulation on IGT scores through CRT, b = 13.18, p < .0001, BCa CI [7.99, 18.36], which explained 57% of the total effect. In contrast, there was no significant indirect effect of stress manipulation on IGT through SBP reactivity, $b = -.58$, $p = .22$, BCa CI [-1.51, .36]. The full model of stress manipulation as a predictor of IGT scores, indirectly through CRT scores is outlined in Figure 1.

In order to test the possibility that a third unmeasured variable can account for these relationships, further mediation analysis were conducted, with SBP reactivity and IGT scores as mediators of the manipulation-CRT scores relationship. These also revealed a significant indirect effect of stress manipulation on CRT scores through IGT scores, $b = .03$, $p < .0001$, BCa CI [0.36, 1.06], which explained 51% of the total effect.

Figure 1 here

Figure 1: Model of stress manipulation as a predictor of IGT scores, mediated by CRT and SBP reactivity. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 10,000 samples.

Discussion

It was hypothesised that the stress manipulation would inhibit performance on the IGT, and would delay the optimization of deck selections; these predictions were supported. The stress manipulation also reduced participants' reflective ability as measured by the CRT. It was further hypothesised that CRT scores would correlate with IGT scores in the later, but not earlier blocks for both conditions. Our findings only partially support this hypothesis; correlations between CRT scores and standard IGT scores were shown in blocks two and three for the control condition and blocks two, three (marginally) and four in the stress condition. We further conducted a mediation regression analysis to examine direct and indirect effects of our stress manipulation, SBP and CRT upon IGT scores. This analysis demonstrated the stress manipulation indirectly affected IGT scores by reducing cognitive reflection, but did not have a direct effect. We discuss each of these findings in turn.

The results showed that stress adversely influenced standard IGT scores, such that stressed participants selected more cards from disadvantageous decks in the later blocks, implying that their learning was impaired. These data accord with previous IGT studies that have shown that stress can interfere with the learning process and lead to a slower improvement in card selections (Preston et al., 2007; van den Bos, et al., 2009). For example, van den Bos et al. (2009) found that high cortisol responses to a stress induction task, the Trier Social Stress Task (Kirschbaum, Pirke & Hellhammer, 1993), were associated with decreased performance on a subsequent IGT. These previous studies of IGT and stress have been interpreted as evidence that stress interferes with the development of somatic markers. Our CRT findings, however, suggest that other factors may also be at play.

Stress reliably reduced reflective ability with CRT scores significantly lower in that condition. This is the first direct test of the CRT under stress and demonstrates that reflective thinking processes are adversely affected by stress. This supports Schwabe, Joels, Roozendaal, Wolf, and Oitzl (2012) and Pabst, Brand and Wolf (2013), who argue variations in neuroendocrine levels can impact higher cognitive processes.

The overall correlation between CRT scores and IGT scores observed for both conditions indicate that higher cognitive processes are implicated in IGT performance. Some theorists (e.g., Brand, Labudda, & Markowitsch, 2006; Brand et al. 2007) have argued that these higher-level processes are only important when participants have figured out the rules of the task. Our correlational data, however, indicate that this reflective processing is significant in earlier blocks, which are generally considered to be the stage when participants are developing their somatic markers (e.g., Bechara & Damasio, 2005) and, therefore would not involve reflective processing. The CRT data should, however, be interpreted with a degree of caution, as there are questions about the specific aspect of analytic processing the CRT measures (e.g., Campiatelli & Gerrans, 2013; Stupple et al., 2013; Toplak, et al., 2011). It has also been associated with risk neutrality (Oechssler, Roider, & Schmitz, 2009) and higher working memory capacity (Stupple et al., 2013) which may result in strategies that are more effective for identifying optimal selections. Despite this caveat, the primacy of emotional learning in the early stages of the task is nonetheless challenged by our data.

The CRT scores in the stress group appeared to correlate with IGT performance for longer than in the control group. This may indicate that the importance of reflective thinking persisted in later blocks for the stress group, however, when comparing correlations across blocks and conditions, only block 1 and 2 were significantly different, and only in the control condition. Moreover, the comparisons between the correlations were not optimally powered and, as such, these data indicate an avenue for future investigation rather than a robust demonstration of the time course of reflective processing in the IGT. Nonetheless, performance in the control group had reached ceiling for most participants by block 4 indicating that conceptual knowledge of deck contingencies had been obtained. In contrast, for the majority of participants in the stress condition deck contingencies remained ambiguous and thus they continued to select fewer advantageous and more disadvantageous cards in block 4, compared with the control condition.

Further, our first mediation analysis was consistent with the proposal that the effect of stress upon overall IGT performance occurs through reducing the capacity for reflective Type II thinking rather than disrupting performance via an alternative route. These data support Preston et al.'s (2007) argument that stress disrupts the slower deliberative processing that occurs in the prefrontal cortex (Gabrieli, Poldrack & Desmond, 1998) and that this can impair the ability to differentiate between advantageous and disadvantageous selections. However, the interpretation that the stress effect operates via reduced Type II thinking is weakened by our second mediation analysis, which indicates that we cannot rule out a more general alternative proposal: the stress manipulation had a broader effect on attention and cognition. For example, stress may have resulted in participants not attending to the outcomes of their choices.

These data indicate that while somatic markers may be necessary, they are not sufficient to disambiguate the deck contingencies. Thus our findings are incongruent with the proposition that IGT performance is primarily dependent on emotional feedback processing (Bechara & Damasio, 1997; Bechara et al, 1994; Bechara et al., 2005), and are instead compatible with the idea that 'cool' reflective processes can be important in overriding intuitive processes that favour short-term gain (Brevers et al., 2013). On this basis we would concur with Brevers et al. that IGT performance is best explained within the context of a dual process framework.

The integration of cognitive and emotional processes is relevant in healthy people, whereby the ability to access and reflect on subjective experiences may improve their performance (Schiebener et al., 2011; Bowman et al., 2005). It has been difficult however, to tease out which phases of the IGT are related to cognitive or emotional learning. Given the potential for individual differences in performance and that the interplay between conscious awareness and emotional processing continues to remain unclear, further tests of healthy individuals are needed.

This study answers the call for greater scrutiny of IGT performance of healthy participants from Steingroever, Wetzels, Horstmann, Neumann, and Wagenmakers (2013). Our data reveal that healthy participants under modest stress behave similarly to problem gamblers (Brevers et al., 2012). Indeed, the effect size associated with block by stress interaction we observed was near identical to Brevers et al. (2012; p. 571) who demonstrated that normal controls performed better than problem gamblers on blocks three, four and five. Thus, when using the IGT as a diagnostic test, care should be taken when interpreting the results as patients or clients may be stressed during testing. Further, we advocate the avoidance of outcome based scoring where IGT scores are analysed and that card selections (positive - negative) are used when measuring IGT performance. Card selections provide a measure of the quality of decisions and are an objectively better measure of participants' learning of deck contingencies and elimination of disadvantageous selections than monetary outcomes. This is because noise from 'lucky' disadvantageous picks or 'unlucky' advantageous picks influences the monetary outcome but can conceal changes in decision quality demonstrated by the card selection variable. The difference we observed between the results from monetary outcomes and card selections emphasises the importance of reducing extraneous variance from random fluctuations caused by the order of card selection. Outcome based scoring can nonetheless be important where the focus of interest is the role of reward or punishment on deck selections.

In conclusion, the results of this study replicate and extend previous studies that have demonstrated a link between stress and IGT performance. Moreover, this research demonstrated the importance of reflective cognition not only in later trials but also in the earlier trials usually associated with learning the task. The results indicate that induced stress impedes analytical thinking and interferes with performance on the IGT. In summary, the findings indicate that reflective participants appear to learn from the outcomes of their choices when making risky decisions even when stressed.

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Table 1. Mean (standard deviation) SBP at Baseline and During IGT, and Stress Perception scores

	SBP		Stress Perception
	Baseline	During	
Control	123.3 (7.0)	128.1 (6.3)	1.17 (.38)
Stress	120.1 (6.2)	134.9 (8.7)	2.03 (.87)

Table 2. Mean (standard deviation) Monetary IGT Scores and Standard IGT Scores per block for Control and Stress group

	Standard IGT Scores		Monetary IGT Scores (£)	
Blocks	Control	Stress	Control	Stress
1	-2.10 (7.3)	-2.25 (7.3)	584.48 (574.78)	579.03 (601.07)
2	-.62 (10.2)	1.0 (6.3)	-495.68 (550.89)	-683.87 (539.69)
3	9.48 (9.1)	3.29 (7.6)	-93.96 (659.39)	-291.93 (537.71)
4	15.1 (8.2)	5.70 (10.4)	362.06 (316.76)	108.06 (508.64)
5	17.37 (5.6)	10.38 (8.5)	435.34 (218.30)	199.19 (420.39)
Total	39.48 (17.2)	18.48 (20.1)	788.8 (667.5)	-89.51 (586.6)

Table 3. Correlations between CRT and Standard IGT scores

Blocks	Control	Stress
1	r= -.117[a], p=.544	r= .080, p=.667
2	r= .568[a], p=.001**	r= .485, p=.006**
3	r= .462, p=.012*	r= .350, p=.053
4	r= .219, p=.254	r= .444, p=.012*
5	r= .051, p=.791	r= .236, p=.200
Total	r= .617, p<.001**	r= .649, p<.001**

*** significant at p<.05, ** significant at p<.01, [a] correlations that different from each other share a superscript.**